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EXAMINER	
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ART UNIT	PAPER NUMBER
1634	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/520,039	KLAPPROTH ET AL.	
	Examiner	Art Unit	
	Katherine Salmon	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 27-54 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 27-54 is/are rejected.

7)☒ Claim(s) 30-31 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 12/04, 7/05.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 27-54 are pending. Claims 1-27 have been cancelled.

2. An action on the merits for Claims 27-54 is set forth below.

Priority

3. Should applicant desire to obtain the benefit of foreign priority under 35 U.S.C. 119(a)-(d) prior to declaration of an interference, a certified English translation of the foreign application must be submitted in reply to this action. 37 CFR 41.154(b) and 41.202(e).

Failure to provide a certified translation may result in no benefit being accorded for the non-English application.

Specification

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 33 is drawn to a method where a binding between the receptor and the ligand in the receptor-ligand complex has a half-life in a range of at least microseconds. The specification does not teach a half-life in a range of at least microseconds for the receptor-ligand complex.

Claim Objections

5. Claims 30-31 are objected to over the recitation of "from the group comprising"

and "selected from the group comprising", respectively, because the claim recites an improper format for a Markush group. Claims which recite members of a Markush group must be 'close-ended.' This objection may be overcome by amendment of the claims to recite, "selected from the group consisting of." See MPEP 2173.05(g) regarding Markush groups wherein it is stated that: "It is improper to use the term "comprising" instead of "consisting of." Ex parte Dotter, 12 USPQ 382 (Bd. App. 1931).")

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 27-49 and 53-54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 27-48 are indefinite over the phrase "having the ability" in Claim 27 line 4. It is unclear the metes and bounds of the phrase "having the ability" because there is no clear definition of the phrase in the specification or the art. It is unclear what ability the receptor needs to have to interact with a ligand.

Claims 28-29 are unclear over the phrase "test sample that is to be examined for its content of ligands". Claim 27 is drawn to determining the number of receptors on a carrier; therefore, it is unclear how a test sample, which is examined for its content of ligands, further limits the claim.

Claim 30 is an improper Markush group because the claim recites multiple alternative "ands". It is unclear if SiO and aluminum oxide is part of the list of potential materials or if they are types of semimetal oxides.

Claim 32 recites the limitation "a binding between the receptor and the ligand in the receptor-ligand complex" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. Claim 27 is drawn to a method wherein the receptor has the ability to form receptor-ligand complexes, however, the method steps do not have a step of actually forming a receptor-ligand complex therefore there is insufficient antecedent basis fro "the receptor-ligand complex".

Claim 33 recites the limitation " in the receptor-ligand complex" in lines 2. There is insufficient antecedent basis for this limitation in the claim. Claim 27 is drawn to a method wherein the receptor has the ability to form receptor-ligand complexes, however, the method steps do not have a step of actually forming a receptor-ligand complex therefore there is insufficient antecedent basis fro "in the receptor-ligand complex".

Claim 33 is unclear over the phrase "a range of at least microseconds". It is unclear what the range would constitute because the phrase "at least microseconds" seems to imply a minimum amount but there is no maximum amount listed in the claim for the range.

Claim 34 is indefinite over the phrase "n markers are associated with n receptors". There is not a clear definition in the specification for "N" and the claim does not define "N". The instant specification provides an embodiment wherein "on average

there are n markers on n receptors" (paragraph 27), however, this limitation does not define what constitutes N.

Claim 40 is unclear over the phrase "a range of nanoseconds". It is unclear what the range would constitute because the phrase does not set a minimum and maximum number for the range.

Claims 45-47 recite the limitation " the ligand" in lines 1. There is insufficient antecedent basis for this limitation in the claim. Claim 27 is drawn to a method wherein the receptor has the ability to form receptor-ligand complexes, however, the method steps do not have a step of actually having an ligand in the reaction therefore there is insufficient antecedent basis for "the ligand".

Claim 47 is unclear over the phrase "fluorescence-labeled ligands" because it is unclear if the fluorescence is the marker, which labels the receptor or another fluorescence label. It is unclear if both the receptor and the label are used.

Claims 49 is indefinite over the phrase "having the ability" in line 4. It is unclear the metes and bounds of the phrase "having the ability" because there is no clear definition of the phrase in the specification or the art. It is unclear what ability the receptor needs to have to interact with a ligand.

Claim 53 is indefinite. It is not clear if the steps of immobilizing a receptor and bringing a marker in contact are multiple steps as drawn to in Claim 50 or one step. Further it is not clear what constitutes a "single step" in the claim when the single step is drawn to "the steps of immobilizing...and bringing a marker in contact".

Claim 54 recites the limitation " the steps of bringing" in lines 1. There is insufficient antecedent basis for this limitation in the claim. It is suggested that the claim be amending to e.g. "a step" to correct antecedent basis.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 27-29, 31-32, 33-37, 41-44, 46, 49-52, and 54 are rejected under 35 U.S.C. 102(b) as being anticipated by Kurane et al. (US Patent Application Publication 2011/0000148 A1 April 5, 2001).

With regard to Claim 27, Kurane et al. teaches immobilizing a probe on a solid support (preparing a carrier by immobilizing at least one receptor (e.g. a probe)) (p. 8 paragraph 161). Kurane et al. teaches forming a marker (florescent signal) and receptor (probe) complex (p. 8 paragraph 161). Kurane et al. teaches a processing step of analyzing the intensity of fluorescence emitted from the reaction system when the target is not hybridized to the probe (p. 7 paragraph 158), therefore, Kurane et al. teaches determining the number of receptors on the carrier by detecting the receptor-marker complex (i.e. the fluorescence emitted).

With regard to Claims 28-29, Kurane et al. teaches adding a target sample (ligand) and measuring the hybridization of the receptor (probe) and target (ligand) by measuring the fluoresce intensity (p. 7 paragraph 158).

With regard to Claim 31, Kurane et al. teaches the receptor is nucleic acid (abstract).

With regard to Claim 32, Kurane et al. teaches that reaction temperature can be varied so that it can be low enough to allow all receptor and ligands to bind or it can be increased such that there is no hybridization (the receptor and ligand are separate) (p. 9 paragraph 174).

With regard to Claim 33, Kurane et al. teaches that the probe (receptor) and the target (ligand) were bond at a specific temperature range for a rand of 1 second to 180 minutes (p.9 paragraphs 174-175). Therefore Kurane et al. teaches binding in a range of at least microseconds because Kurane et al. teaches binding of more than 1 microsecond.

With regard to Claim 34, Kurane et al. teaches a method wherein n markers are associated with n receptors (figure 6). "N" is being interpreted as any number of markers associated with any number of receptors and therefore Figure 6 discloses two markers associated with 2 receptors.

With regard to Claims 35-37, Kurane et al. teaches that the marker can be a fluorescent dye such as rhodamine and tetramethylrhodamine (a reactive group) (p. 6 paragraph 144).

With regard to Claim 41, Kurane et al. teaches that FRET can be used (p. 10 paragraph 190).

With regard to Claim 42, Kurane et al. teaches that the binding of the ligand to the probe (receptor) reduces florescence therefor the interaction of the ligand modifies FRET (abstract).

With regard to Claim 43-44 and 46, Kurane et al. teaches that a probe labeled with a fluorescent dye quenches when a target is hybridized (p. 2 paragraph 19). Therefore the receptor contains a dye which acts as a donor and the is quenched by an acceptor. Further, Kurane et al. teaches that hybridization of the ligand brings the donor and the acceptor of FRET into contact because Kurane et al. teaches that the hybridization of the ligand to the receptor decreases fluorescence.

With regard to Claim 49, Kurane et al. teaches immobilizing a probe on a solid support (preparing a carrier by immobilizing at least one receptor (e.g. a probe)) (p. 8 paragraph 161). Kurane et al. teaches forming a marker (florescent signal) and receptor (probe) complex (p. 8 paragraph 161). Kurane et al. teaches a processing step of analyzing the intensity of fluorescence emitted from the reaction system when the target is not hybridized to the probe (p. 7 paragraph 158), therefore, Kurane et al. teaches determining the number of receptors on the carrier by detecting the receptor-marker complex (i.e. the fluorescence emitted). Kurane et al. teaches that the marker can be a fluorescent dye such as tetramethylrhodamine (a reactive group) (p. 6 paragraph 144).

With regard to Claim 50, Kurane et al. teaches immobilizing a probe on a solid support (preparing a carrier by immobilizing at least one receptor (e.g. a probe)) (p. 8 paragraph 161). Kurane et al. teaches forming a marker (florescent signal) and receptor (probe) complex (p. 8 paragraph 161). Kurane et al. teaches a processing step of analyzing the intensity of fluorescence emitted from the reaction system when the target is not hybridized to the probe (p. 7 paragraph 158), therefore, Kurane et al. teaches determining the number of receptors on the carrier by detecting the receptor-marker complex (i.e. the fluorescence emitted).

With regard to Claim 51, Kurane et al. teaches coating the carrier with a polylysine prior to binding a receptor (preparing the carrier) (p. 8 paragraph 162).

With regard to Claim 52, Kurane et al. teaches that the probes already labeled (receptor-marker complex) can be attached to the carrier (p. 8 paragraph 161).

With regard to Claim 54, Kurane et al. teaches adding a target sample (ligand) and measuring the hybridization of the receptor (probe) and target (ligand) by measuring the fluoresce intensity (detecting receptor-ligand complexes) (p. 7 paragraph 158).

8. Claim 40 is rejected under 35 U.S.C. 102(b) as being anticipated by Kurane et al. (US Patent Application Publication US 2011/0000148 A1 April 5, 2001) as applied to Claims 27-29, 31-32, 33-37, 41-44, 46, 49-52, and 54 and as evidence by Cremer et al. (US Patent 5922543 July 13, 1999).

Kurane et al. teaches immobilizing a probe on a solid support (preparing a carrier by immobilizing at least one receptor (e.g. a probe)) (p. 8 paragraph 161). Kurane et al. teaches forming a marker (florescent signal) and receptor (probe) complex (p. 8 paragraph 161). Kurane et al. teaches a processing step of analyzing the intensity of fluorescence emitted from the reaction system when the target is not hybridized to the probe (p. 7 paragraph 158), therefore, Kurane et al. teaches determining the number of receptors on the carrier by detecting the receptor-marker complex (i.e. the fluorescence emitted).

With regard to Claim 40, Kurane et al. teaches that the marker can be a fluorescent dye such as rhodamine and tetramethylrhodamine (a reactive group) (p. 6 paragraph 144). Cremer et al. teaches the half-life of rhodamine derivatives in the nanosecond range (Column 20 lines 4-6).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurane et al. (US Patent Application Publication US 2011/0000148 A1 April 5, 2001) in view of Sosnowski et al. (US Patent 6051380 April 18, 2000).

Kurane et al. teaches immobilizing a probe on a solid support (preparing a carrier by immobilizing at least one receptor (e.g. a probe)) (p. 8 paragraph 161). Kurane et al. teaches forming a marker (florescent signal) and receptor (probe) complex (p. 8 paragraph 161). Kurane et al. teaches a processing step of analyzing the intensity of fluorescence emitted from the reaction system when the target is not hybridized to the probe (p. 7 paragraph 158), therefore, Kurane et al. teaches determining the number of receptors on the carrier by detecting the receptor-marker complex (i.e. the fluorescence emitted).

However, Kurane et al. does not teach a carrier comprises of silicon, semimetal oxides, including SiO, and aluminum oxide.

Sosnowski et al. teaches the use of a carrier which is comprised of silicon (Column 9 lines 4-5).

Therefore it would have been prime facie obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Kurane et al. to use a silicon based carrier as taught by Sosnowski et al. The ordinary artisan would have been motivated to modify the method of Kurane et al. to use a silicon based carrier as taught by Sosnowski et al. because Sosnowksi et al. teaches that silicon layer provides a better chemical interface to provide a more stabile and robust carrier (Column 48 lines 20-28). The ordinary artisan would be motivated to produce a carrier, which is stabile and robust in order to produce a fabricated carrier comprising receptors, which could be used and stored easily without degradation.

11. Claims 38-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurane et al. (US Patent Application Publication US 2011/0000148 A1 April 5, 2001) in view of Laugharn, Jr. et al. (US Patent 6245506 June 12, 2001).

Kurane et al. teaches immobilizing a probe on a solid support (preparing a carrier by immobilizing at least one receptor (e.g. a probe)) (p. 8 paragraph 161). Kurane et al. teaches forming a marker (florescent signal) and receptor (probe) complex (p. 8 paragraph 161). Kurane et al. teaches a processing step of analyzing the intensity of fluorescence emitted from the reaction system when the target is not hybridized to the probe (p. 7 paragraph 158), therefore, Kurane et al. teaches determining the number of receptors on the carrier by detecting the receptor-marker complex (i.e. the fluorescence emitted).

However, Kurane et al. does not teach a marker comprising inherent fluorescence such as tryptophan.

With regard to Claims 38-39, Laugharn, Jr. et al. teaches a method using inherent fluorescence as labels (Column 13 lines 6-18). Laugharn Jr, et al. teaches that one of the labels can be tryptophan (Column 13 lines 6-18).

Therefore it would have been prime facie obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Kurane et al. to use a tryptophan label as taught by Laugharn Jr. et al. The ordinary artisan would have been motivated to modify the method of Kurane et al. to use a tryptophan label as taught by Laugharn Jr. et al., because Laugharn Jr. et al. teaches that labels such as tryptophan have a characteristic wavelength which can be detected without the need for separation of the product nucleotides from the substrate (Column 13 lines 6-18).

12. Claims 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurane et al. (US Patent Application Publication US 2011/0000148 A1 April 5, 2001) in view of Brenner et al. (US Patent 5695934 December 9, 1997)

Kurane et al. teaches immobilizing a probe on a solid support (preparing a carrier by immobilizing at least one receptor (e.g. a probe)) (p. 8 paragraph 161). Kurane et al. teaches forming a marker (florescent signal) and receptor (probe) complex (p. 8 paragraph 161). Kurane et al. teaches a processing step of analyzing the intensity of fluorescence emitted from the reaction system when the target is not hybridized to the probe (p. 7 paragraph 158), therefore, Kurane et al. teaches determining the number of

receptors on the carrier by detecting the receptor-marker complex (i.e. the fluorescence emitted).

However, Kurane et al. does not teach a marker which is a microparticle.

With regard to Claims 48, Brenner et al. teaches microparticles used as fluorescent labels (Column 20 lines 30-45).

Therefore it would have been prime facie obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Kurane et al. to use a microparticle labels as taught by Brenner et al. The ordinary artisan would have been motivated to modify the method of Kurane et al. to use a microparticle label as taught by Brenner et al., because Brenner et al. teaches that microparticles permit resolution on a plane at a density between about ten thousand to one hundred thousand microparticles (column 20 lines 30-45). The ordinary artisan would be motivated to use microparticles in order to detect as many receptors as possible immobilized on the carrier.

Conclusion

13. No claims are allowed.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine Salmon whose telephone number is (571) 272-3316. The examiner can normally be reached on Monday-Friday 8AM-430PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Katherine Salmon
Examiner
Art Unit 1634

/Carla Myers/
Primary Examiner, Art Unit 1634